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BIOMETRIC CHARACTERISTICS, LENGTH-WEIGHT RELATIONSHIP, FOOD AND FEEDING HABIT AND CONDITION FACTOR OF *ALESTE BAREMOSE*

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ABSTRACT

Biometric characteristics, length weight relationship, food and feeding habit and condition factor of Aleste baremose from Lower River Benue were determined. Among the morphological indices of A. baremose from Lower River Benue, total length, standard length, head length, snout length weight, gut weight, gut length, eye diameter and condition factor were higher in female samples than the male counterpart. Of the biometric indices, no significant difference (p>0.05) existed between the female and male total length, gut length, gut weight and eye diameter. From the length weight relationship, of male A. baremose had better 'b' value (2.83) than the female counterpart (2.76). The most frequently consumed food item by A. baremose was digested food particles (13.33%) while the least was sand (1.67%). Numerically, the most food item consumed by A. baremose was unidentified food items (34.07%) while the least was sand (5.49). Of the 160 samples of A. baremose used for this work, while 64.38 had empty stomach, 35.62% had different food items in their stomachs. Of the stomach with food items, while 17.50% was recorded for quarter-full stomach, the least (3.13%) was recorded for three-quarter full stomach.

Key words: Morphological characteristics, length-weight relationship, food and feeding habit, condition factor, *A. baremose*, River Benue

INTRODUCTION

Human activities have fragmented and simplified the tropical wetland habitat. Resources enjoyed by the wetland communities are systematically being destroyed. Sustainable management and conservation of the wetland resources are urgently required and one of the most commonly used in the analysis of Fisheries data is length- weight relationship (Obande *et al*., 2017). Accurate fisheries statistics in the water body and its adjourning flood plains is vital for the formulation of a sound fisheries management programme. Dietary analysis of organisms in their natural habitats enhances the understanding of their growth, productivity, abundance, and distribution, as well as knowledge of their trophic relationships (Ikpi *et al.*, 2012).

Many studies have been carried out on the biology and ecology of different freshwater commercially important fish species which has been recognized as aquaculture species (Omoreigie, 2001). These include the works of Blake and Blake (2006), Ayotunde *et al*. (2007), Montchowui *et al*. (2008), Montchowui *et al*. (2010), Ayoade (2011), Offem *et al*. (2011), Adeyemi and Akombo (2012), Ikpi *et al*. (2012), Tiogue *et al*. (2013), Adadu *et al*. (2014) and Abobi *et al*. (2015).

Various aspects of the biology and ecology of the commercially important fish species (*Alestes baremose)* have been conducted in Nigeria; however, there is dearth of information on the biometric characteristics, length-weight relationship food and feeding habit and condition factor. This therefore prompts the need to investigate the biometric characteristics, length-weight relationship food and feeding habit and condition factor of *A. baremose* from Lower River Benue, with a view to providing baseline information for its management in the wild and

under culture, considering the fact that *A. baremose* forms one of the major commercially important fishes in the catches of fishermen from Lower River.

MATERIALS AND METHODS

Collection of samples

One hundred and sixty (160) samples of *A. baremose* were obtained from artisanal fishermen at Wadata fish landing site of Lower River Benue in batches between September and December, 2016.

The fish were caught using various types of fishing gears such as traps, seine nets, cast net, gill nets, clap nets, hook, and line while crafts such as canoe and calabash. The samples were taken to the Fisheries and Aquaculture Laboratory of University of Agriculture, Makurdi, Benue State, Nigeria in ice chest after collection and were examined in fresh condition.

Length and weight measurements and Condition factor of the fish samples

The measurements (total and standard length) of the fish were taken by placing it on a flat board. Total length, standard length, gut length and head length were measured in centimeters using a meter rule. The weights (Total weight, gutted weight and stomach weight) of the samples were obtained using electric top-loading (Metler) balance in grams.

The length-weight relationship was calculated using the equation by Van Snik *et al*., (1997) as follow;

Log W= log a + b log L

The condition factor (K) was calculated according to the equation by Pauly (1983) below:

$(K) = 100*W/L^3$

Stomach fullness

The fullness of the stomachs were scored as 0, 25, 50, 75 and 100% (empty, quarter, half, three quarter and full stomachs), respectively as described by Olatunde (1979).

Stomach content analysis

The guts of the samples were removed by making a longitudinal incision along the mid-ventral line from the anus to the mouth to expose the visceral organs (Olatunde, 1979). The guts were removed carefully by detaching it from other internal organs and fatty tissues. The gut length (GT) was measured to the nearest centimetre on a graduated measuring board. The stomach was cut off from the gut and weighed on an electric top-loading balance to obtain the stomach weight in grams (g).

Identification of food items

Each stomach of the samples was slit open and the contents emptied into a Petri-dish. The content was then checked and identified using a microscope. The food materials were identified with the aid of keys by Needham and Needham (1962) and Mellanby (1975).

Data analysis

Length weight data obtained was subjected to regression analysis while data on biometric measurements were subjected to analysis of Variance (ANOVA) and descriptive statistics using SPSS Version 17.

Stomach contents were analyzed using:

i. Frequency of occurrence method as follows:

P = (b/a) x 100 (Hynes, 1980)

Where, a= Total number of fish examined with food in their stomach, b = Number of fish containing a particular food item, p= percentage of occurrence of each food item

ii. Numerical method (Inyang and Nwani, 2004):

$$\% \boldsymbol{Number\ of\ food} = Summation\ of\ each\ food\ item\ got\ x\ 100 / Total\ number\ of\ all\ food\ items$$

RESULT

Results of the Mean biometric indices of *A. baremose* from Lower River Benue are shown in Table 1. Of the biometric indices, total length, standard length, head length, snout length weight, gut weight, gut length, eye diameter and condition factor were higher in female samples than the male counterpart though, no significant difference ($p>0.05$) existed between the female and male total length, gut length, gut weight and eye diameter.

Table 1: Mean biometric indices of *A. baremose* from Lower River Benue

Biometric indices	Sex		P value
	Female	Male	
Total length	20.26±0.50	20.42±o.30	0.77^{Ns}
Standard length	16.14±0.42	15.50±0.24	0.01
Head length	4.89±0.15	4.15±0.09	0.00
Snout length	1.28±0.05	0.98±0.03	0.00
Gut length	15.80±0.44	15.96±0.33	0.77^{Ns}
Weight	90.27±6.30	76.43±3.20	0.03
Gut weight	4.33±0.18	4.18±0.13	0.50^{Ns}
Eye diameter	0.81±0.02	0.80±0.01	0.67^{Ns}
K	1.01±0.02	0.86±0.01	0.00

Ns = Not significant

Results of the length weight relationship of male, female and combined sexes of *A. baremose* from Lower River Benue are presented in figures 1, 2 and 3, respectively. Male *A. baremose* had better 'b' value (2.83) than the female (2.76).

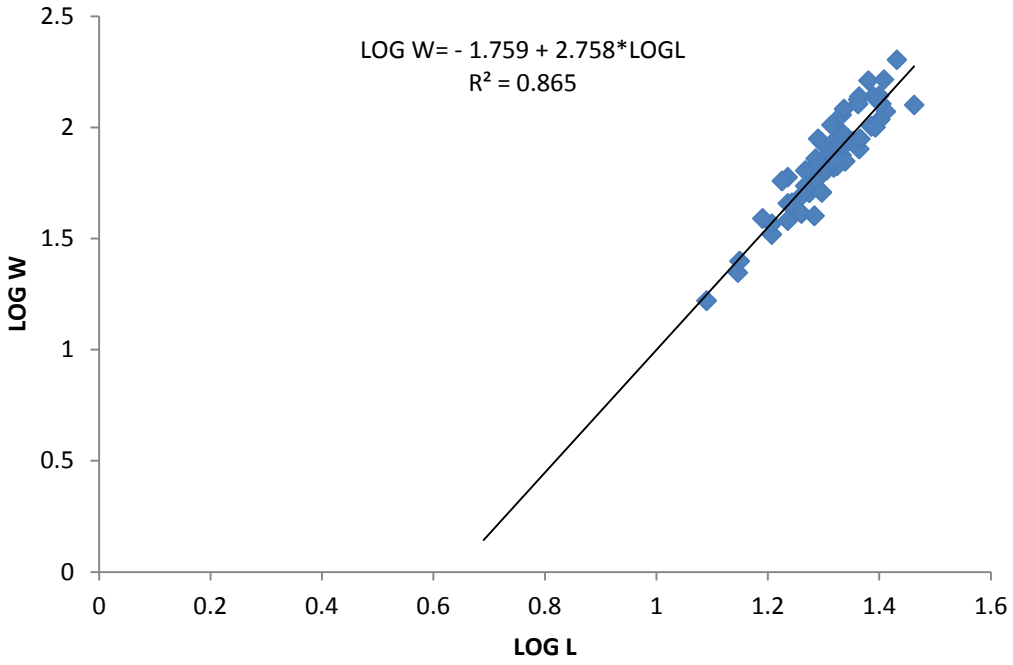

Fig. 1: Length weight relationship of male *A. baremose* from Lower River Benue

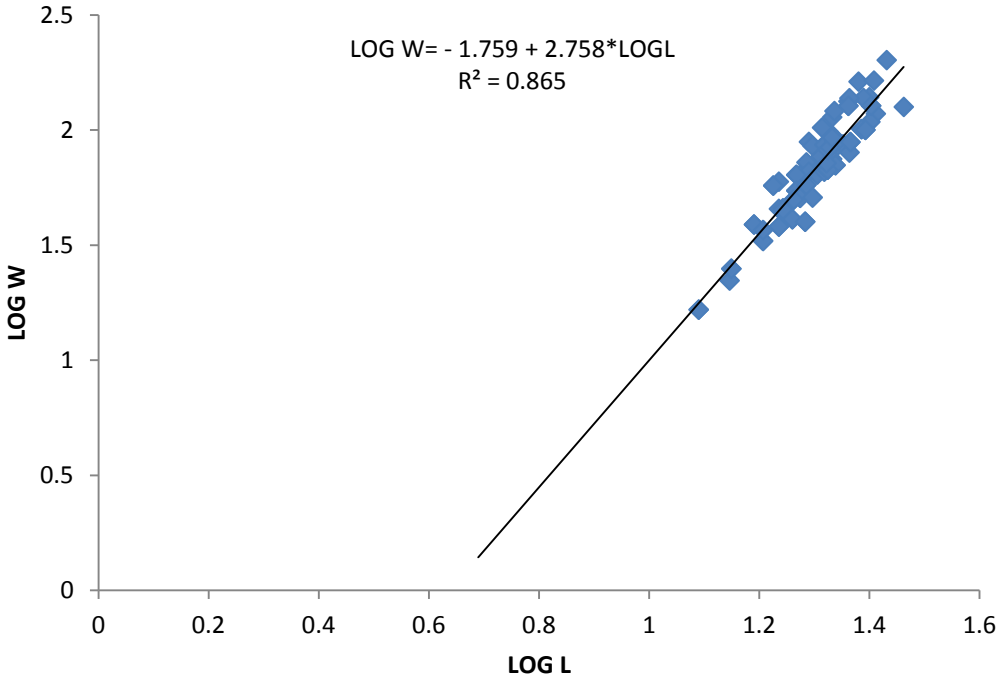

Fig. 2: Length weight relationship of female *A. baremose* from Lower River Benue

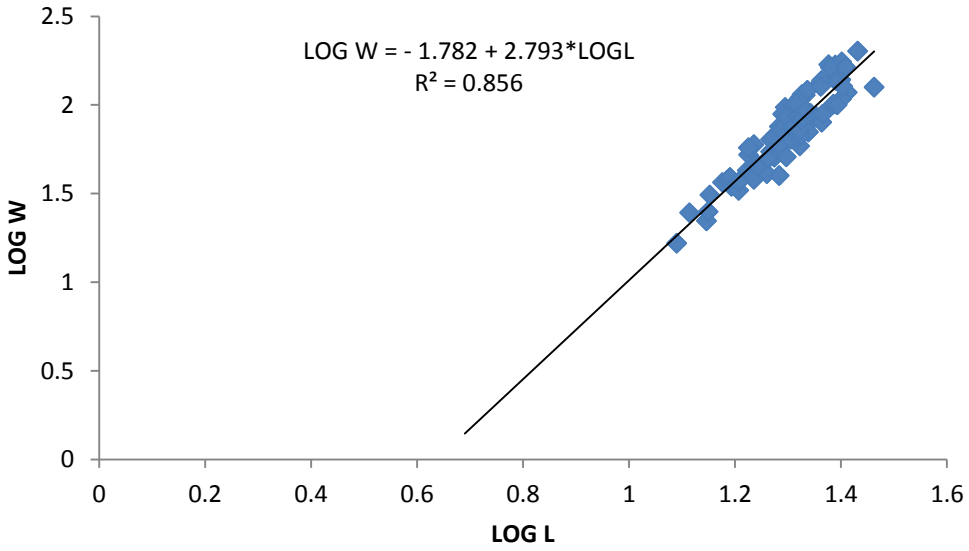

Fig. 3: Length weight relationship of combined sexes of *A. baremose* from Lower River Benue

Results of the food composition of *A. baremose* from Lower River Benue are presented in figure 4 while figure 5 shows the results of the categorization of stomach fullness of *A. baremose* from Lower River Benue. Of the food composition, the most frequently consumed food item by *A. baremose* was digested food particles (13.33%) while the least was sand (1.67%). Numerically, the most food item consumed by *A. baremose* was unidentified food items (34.07%) while the least was sand (5.49).

Based on the categorization of stomach fullness of *A. baremose*, of the 160 samples of *A. baremose* while 64.38% had empty stomach, 35.62% had different food items in their stomachs. Of the stomach with food items, while 17.50% was recorded for quarter-full stomach, the least (3.13%) was recorded for three-quarter full stomach.

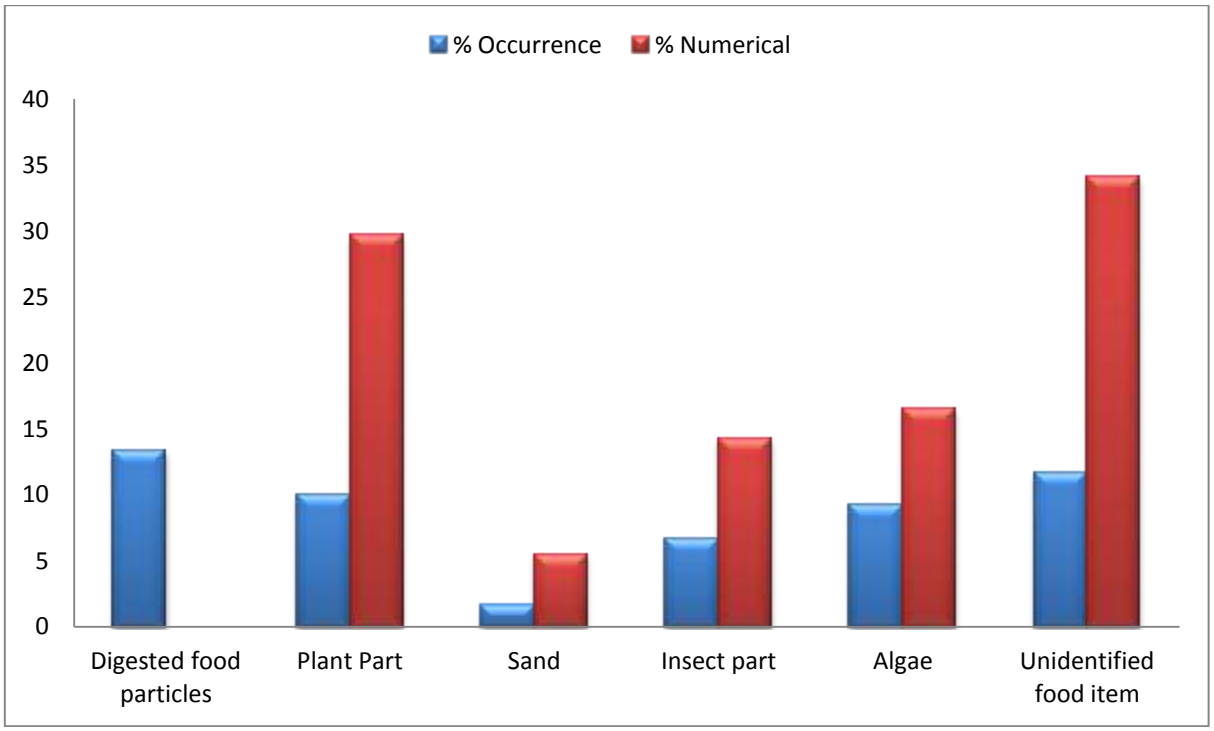

Fig. 4: Diet composition of *A. baremose* from Lower River Benue

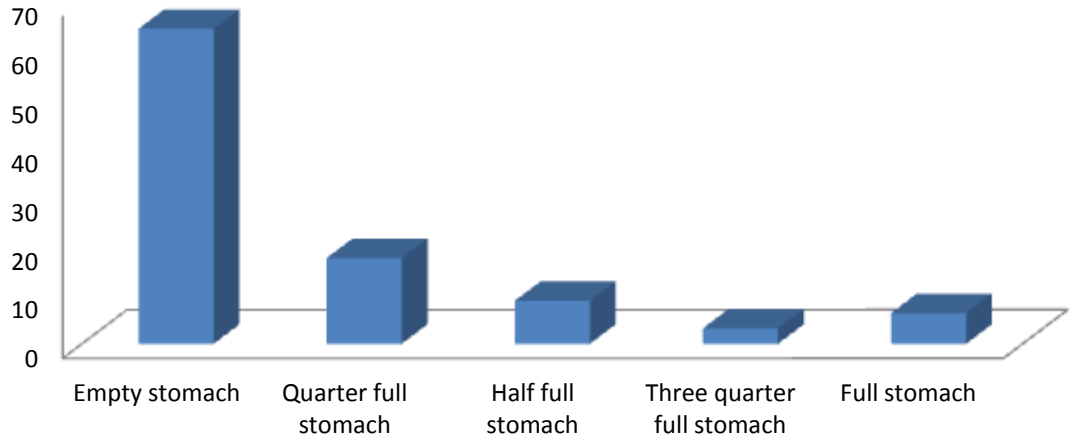

Fig. 5: Categorization of stomach fullness of *A. baremose* from Lower River Benue

DISCUSSION

Length weight relationship and condition factor of *A. baremose* from Lower River Benue was determined. High positive correlation (r^2 = 0.899 for male, 0.865 for female and 0.856 for combined sexes) were exhibited by the fish indicating that as length of the fish increased, its body weight also increased. This could be attributed to the availability of quality and quantity of food and plankton yield resulting from, the water body within the ecological niches of the fish. Peepple and Ofor (2011) had made similar observation. The 'b' values for male, female combined sexes obtained in this present work fell within the range of 'b' values reported by Bagenal and Tech (1978) , Kurtakis and tsikiliras (2003).

The differences in the length-weight relationship parameters of *A. baremose* could be attributed to a series of factors such as season, habitat, gonad maturity, sex, diet, stomach fullness, health, and environmental conditions. Similar observation had been made by Bagenal and Tech (1978: Froese; 2006).

The condition factor of *A. baremose* from lower river Benue were relatively high and this could be an indication that the species farred well in the

Lower Benue river. The sex ratio for *A. baremose* in Lower River Benue, was in favour of females than the males. The sex ratio that favoured females than the males may account for their reproductive success in Lower River Benue.

Differences in the K-values in the fish species might be due to food abundant, adaption to the environment and gonad development. This agrees with the reported findings of Soyinka and Adekoya (2011), Frota (2004) and king (1996) who reported that variations of k may be indicative of food abundance, adaption to environment and egg development in fish. Peepple and Ofor (2011) had male similar observation.

The large proportion of the empty stomachs in this study could be attributed to post harvest digestion, which may have occurred after the fish were caught before their removal from the nets used in trapping them. Similar reports of large percentages of empty stomachs have been reported by Ipinjolu *et al*. (1996), Balogun (2000), Dadebo *et al.* (2005) and Shinkafi *et al*. (2011).

The presence of most plant materials such as plant parts and algae in the guts of the samples indicated that the species was a herbivore with tendency to feed on other food items such as sand, undigested food particles and unidentified food items whose presence indicated bottom feeding nature of *A. baremose* from Lower River Benue. A similar finding was reported for this species in the Idah Area by River Niger (Adeyemi and Akombo, 2012) and for *L. coubie* in Lower Benue River (Adadu *et al.*, 2014).

CONCLUSION

Of the biometric indices, total length, standard length, head length, snout length weight, gut weight, gut length, eye diameter and condition factor were higher in female samples than the male counterpart. Male *A. baremose* had better 'b' value than the female. The most frequently consumed food item by *A. baremose* was digested food particles while the least was sand. Numerically, the most food item consumed by *A. baremose* was unidentified food items (34.07%) while the least was sand (5.49).

For better understanding of the stock assessment of *A. baremose*, more research should be carried out most especially, on this species of fish from Lower River Benue since they can easily be incorporated in polyculture system of aquaculture.

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